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IN THE

Supreme Court of the United States

OCTOBER TERM, 1945

No. 46

GENERAL ELECTRIC COMPANY,
Petitioner,

vs.

JEWEL INCANDESCENT LAMP COMPANY, *et al.*,
Respondents.

BRIEF FOR PETITIONER

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Opinions of the Courts Below

The opinion of the District Court (R. 327)* is reported at 47 F. Supp. 818. The opinion of the Circuit Court of Appeals (R. 349) is reported at 146 F. (2d) 414.

Jurisdiction

This is a suit for patent infringement which is before this Court on a writ of certiorari to the Circuit Court of Appeals for the Third Circuit under the provisions of Section 240(a) of the Judicial Code as amended by the act of February 13, 1925, c. 229 (28 U. S. Code, Sec. 347).

The judgment of the Circuit Court of Appeals for the Third Circuit, which petitioner seeks to have reversed, was

* The record was printed for use in the Circuit Court of Appeals as a "Joint Appendix" to the briefs, and the page numbers are followed by an "a", which we have omitted for convenience in citing the record in this brief.

entered December 22, 1944 (R. 353). The petition for writ of certiorari was filed March 20, 1945 and was granted April 9, 1945.

Statement of the Case

This is a suit for infringement of Pipkin patent No. 1,687,510, issued to the petitioner, and entitled "Electric Lamb Bulb" (R. 1-7). This patent will expire in October of this year.

There is a conflict of decision between different Circuit Courts of Appeals as to the validity of this patent. Prior to the present case, it had been held valid and infringed by the Circuit Court of Appeals for the Sixth Circuit in *General Electric* v. *Save*, 82 F. (2d) 100, and by the Circuit Court of Appeals for the Second Circuit in *General Electric* v. *Wabash*, 93 F. (2d) 671; certiorari denied 303 U. S. 641. In the present case this patent was held invalid—erroneously we believe—by the Circuit Court of Appeals for the Third Circuit, affirming the District Court.

The diffusing bulb problem.

The Pipkin invention, which has met with extensive and well-deserved commercial success (R. 25), consists of a novel, inside frosted, incandescent lamp bulb.

Long prior to the present invention, it had been recognized that it would be desirable to provide some means to reduce the glare produced by the brilliant filament of an ordinary incandescent electric lamp having a clear bulb, if this could be done without seriously reducing the total light output. Many things had been tried, such as coloring the bulb, coating the bulb with special paint, making the bulb out of a special translucent "opal" glass, molding irregularities on the outside of the bulb and "frosting" the outside of the bulb by sand blasting or acid etching.

Plaintiff's Exhibit 12 (R. 147, 10-13) shows a whole series of lamps which represent early attempts by plaintiff

to produce bulbs which would be free of glare. Some of these were externally frosted bulbs, some molded bulbs, and one a painted bulb,—but all of them had objectionable features and none was satisfactory (R. 10-13, 84).

The most common diffusing, or glare reducing, bulb prior to Pipkin's invention was a bulb frosted on the outside surface, as, for example, by treating the outside surface of the bulb with an acid frosting solution (R. 11, 15). Such a treatment eats away or irregularly etches into the glass surface a multitude of tiny crevices, millions of them to the square inch (R. 60). As the light passes through the glass, its irregular etched surface breaks up the rays, giving a cloudy, or frosted, appearance to the glass and reducing the glare.

Although these outside frosted bulbs satisfactorily reduced glare, they had the serious defect that the rough outside surface quickly became dirty and was almost impossible to clean, with the result that the light output was very soon greatly reduced (R. 12, 15).

As the District Court below stated,

> "the disadvantages of the frosted exterior had been generally recognized prior to the present invention" (R. 327).

As early as 1903, twenty years before Pipkin, an *inside* frosted bulb had been suggested (Kennedy Patent No. 733,972, R. 259), since frosting a bulb on the inside would leave the outside surface smooth and easily cleaned.

This suggestion, however, did not solve the problem of finding a satisfactory diffusing lamp bulb, because of a curious difference which was found to exist between an inside and outside frosted bulb.

When the *outside* surface of a bulb is frosted in the ordinary way, it does not affect the strength of the bulb materially. But when the *inside* surface is thus frosted, such frosting reduces the bulb's strength so greatly that its strength is but a small fraction (about 5 to 7% of its orig-

inal value, and renders the bulb unfit for practical use on that account (R. 17; 142, lines 31-53).

Prior to Pipkin no one knew why inside frosted bulbs were so weak, nor how to remedy this weakness. Inside frosted bulbs had been recognized as desirable for more than twenty years, but because of their apparently unavoidable weakness their commercial production was impracticable.

As the Pipkin patent states (R-141, lines 23-27),

> "As heretofore produced, bulbs and similarly thin articles thus frosted on the inside have been fragile to such a degree as to occasion prohibitive breakage."

And as the District Court stated below (R. 327),

> "it had also been recognized that the frosted interior, although otherwise advantageous, impaired the strength of the bulb."

Pipkin's invention changed all this. It created for the first time a commercially strong inside frosted bulb. This was an entirely new article of commerce—something which had never existed before. And it was of great value as shown by the fact that the bulb has gone into very extensive use, over two and one-half *billion* General Electric lamps using the Pipkin bulb having been sold (R. 25).

Pipkin's problem was to devise a commercially strong inside frosted lamp bulb. The bulb that he invented, which solved that problem, was a bulb with a particular configuration on its inner surface. It is this new article, an inside frosted bulb with frosting of a particular configuration, that is the subject of the claims of the Pipkin patent.

The Pipkin Invention and Patent.

Pipkin found that if the crevices, which were eaten away by the acid on the inside of the bulb, were *rounded crevices* as distinguished from the sharp, angular crevices produced

by ordinary frosting, *the bulb would be nearly as strong as a clear bulb.* He accomplished this result by taking the inside frosted bulb which had been made fatally weak by having had glass eaten away from its surface, and subjecting its inside surface to a second, weaker, acid treatment which *dissolved away additional glass* and rounded out the previously angular crevices.

This additional treatment, *although it dissolved away additional glass from the inside surface of the bulb, produced the wholly unexpected and paradoxical result of restoring the bulb almost to its original strength.*

The new bulb was many times as strong as the prior inside frosted bulb. *Indeed, it could be made virtually as strong as a clear bulb, which means an increase in strength of about* 1200%. *or more over the original, weak, inside frosted bulb.*

This remarkable strengthening of the bulb resulted from modification in the structure of the frosted surface, a rounding out, by the second and weaker acid treatment, of the multitude of extremely minute, sharp angular crevices, which are formed on the inside surface of the bulb by the first treatment (Patent p. 3, line 127 et seq.; Spencer R. 21).

The Pipkin patent (R. 141-144), after pointing out the desirability of inside-frosted bulbs in that they give better diffusion with lower absorption of light than outside frosted bulbs and can be more easily cleaned, refers to the fact (p. 1, lines 23-27) that "as heretofore produced" such bulbs "have been fragile to such a degree as to occasion prohibitive breakage."

The object of the invention is said to be

> "to produce an inside frosted glass bulb which will be much stronger than those heretofore produced" (p. 1, lines 33-35).

After commenting upon current methods of frosting, involving the use of an ammonium compound and hydrofluoric acid, with the preferable addition of certain other

materials such as barium sulphate, sodium salts, dextrin, etc., the patent proceeds to say (p. 1, line 68 et seq.):

> "When the inside surface of a lamp bulb is subjected to these frosting mixtures to the extent necessary to produce a practical frost, that is, one which will produce the proper light diffusion, the article becomes extremely fragile. I have found, however, that if the bulb is given a further treatment, which I term a strengthening treatment, in which it is subjected to an etching or frosting treatment *of lower degree than that to which it was first subjected,** it becomes quite strong. Indeed, it may be made practically as strong as the original clear glass bulb."

A suitable formula for the first or conventional etching is stated at the top of page 2 of the patent and a suitable formula for the second, weaker, etching mixture is stated in the patent at page 2, lines 84 to 86. Since the claims of the patent are directed to the final product, the new bulb itself, it is unnecessary to refer to these formulae in detail.

The patent contains a number of diagrams (Figs. 1 to 5). Of these, Fig. 2, explained in the specification at page 2, lines 64-98, is particularly significant. The curve in the drawing marked "Frosting" shows how the strength of a bulb is weakened by the usual frosting treatment applied on its inner surface in a matter of 20 or 30 seconds to a value of 3 or 4 units as compared with an original strength of 44.8 units.** The curve marked "Treating" shows the restorative effect of the second treatment, which produces the rounding effect on the theretofore sharp angular crevices. When this rounding effect has been produced, as by the second treatment with the weaker solution, the strength of the bulb, reduced by the first treatment to a

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* Emphasis ours throughout.

** These measurements of strength are made by an ivory ball "bump tester" illustrated in Fig. 6 of the patent and described in the specification at page 3, lines 72-92.

value of 3.2 units, is restored to approximately initial clear bulb strength of 45 units.

These tests of the patentee, surprising as their results may seem, are verified by the expert testimony (Spencer, R. 55, 56); and, indeed, their correctness is unchallenged.

The patentee says that it is not necessary in practice that the strength of the frosted bulb be restored to the full strength of the clear bulb.

> "In practice it is aimed to keep the strength above 20 or about 45% that of the clear bulb" (p. 2, lines 47-49).

Figure 3 indicates that Pipkin's strengthening treatment, while greatly increasing the strength of the inside frosted bulb, does not increase its glare to an objectionable extent and does lower its absorption of light (patent p. 3, l. 28-32).

Other tests, the results of which are shown in Fig. 5 of the patent, proved that the total light radiated from the inside-frosted bulb of the patent is substantially the same, for any given wattage, as the light radiated from a clear bulb (patent p. 3, lines 66-71). Hence the bulb of the patent produces its glare-reducing effect without material loss of lighting efficiency.

An apparatus which may be used for producing Pipkin's novel bulb is shown in Figs. 7 and 8 of the patent. The bulb 25 shown at the left is a clear bulb about to have a frosting solution from the reservoir 20 sprayed into it, by air pressure, through pipe 24. At this station the frosting solution is sprayed into it for a few seconds. The bulb 25 shown at the middle station has already been subjected to the first treatment and is ready to have the residue of the first frosting solution washed out of it. In this condition it is a fatally fragile structure because of the sharp angular crevices which characterize its interior surface. At the right-hand station the bulb is shown in position to be treated with the second, weaker, acid solution contained in the

reservoir 34. This solution, sprayed into the bulb for five-second periods at five second intervals (patent, p. 2, lines 58-62) in a manner similar to the treatment of the first station, while dissolving away additional glass from the inner surface of the bulb, rounds the theretofore sharp angular crevices, producing the patented bulb with its characteristic inside surface and making the bulb "practically as strong as the original bulb."

Pipkin very properly did not undertake to explain in his patent *why* it is that the conventional etching treatment produces the sharp angular crevices, nor *why* it is that the second treatment with the weaker solution rounds the crevices. Pipkin was the first to produce an inside frosted bulb with the rounded crevice structure, which bulb he discovered to be the answer to the problem of a satisfactory diffusing lamp bulb. It was this new *article* which he patented, not any *theory* of frosting action.

According to the experts (R. 11, 18, 19, 125), the ordinary frosting solution reacts with the dissolved glass to form silicofluoride crystals, which crystals are deposited from the solution upon the glass surface. When these crystals have been deposited on the glass the acid cannot eat away the glass beneath, though it continues to attack the uncovered portion of the glass at the edges of the crystals, thus forming additional crystals and making the original crystals increase in size until, as the process continues, the growing crystals meet each other and the whole surface of the glass is covered by them. If the surface is then washed in water, the crystals will dissolve and the glass will have a frosted appearance, the structure of the glass surface, uncovered by washing away the crystals, being a series of pyramidal peaks surrounded by crevices which are sharply angular where the sides of the adjoining peaks meet. The surface thus produced is covered by a multitude of tiny, sharply angular crevices, so small that there may be some 6,000,000 or 7,000,000 of them to a square inch (R. 60).

If now the surface is again subjected to an etching solution, this time a *weaker*, or more dilute solution, or

nder such conditions that additional crystals are not de-
posited, more glass is eaten away, but the previously
formed sharp angular crevices are rounded.

As a result of Pipkin's discovery that rounding these crevices resulted in a strong bulb, it may be recognized *now* that it was the sharpness of these minute crevices that was responsible for the extraordinary weakness of prior inside frosted bulbs. But prior to Pipkin's discovery of the *remedy* for that weakness no one had any understanding of its cause.

The problem was a peculiarly mysterious and baffling one because outside frosted bulbs were satisfactorily strong notwithstanding the fact that they had exactly the same sharp crevices on their outside surface as that which resulted in fatally weak inside frosted bulbs. For the two decades following the Kennedy patent of 1903 suggesting inside frosting, the sharpness of the tiny crevices remained above suspicion as the cause of the weakness of inside frosted bulbs.

It was not until Pipkin devised this new article, an inside frosted bulb made strong by having rounded as distinguished from sharp, angular crevices, that a commercially strong inside frosted bulb was available to the public, and it is this *new article* which is the subject of the claims of the Pipkin patent.

The Claims.

Claim 1 of the patent reads as follows:

> "1. A glass electric lamp bulb having its interior surface frosted by etching so that the maximum brightness of an ordinary incandescent lamp comprising such a bulb will be less than twenty-five per cent of that of said lamp with a clear bulb, said interior bulb surface being characterized by the presence of rounded as distinguished from sharp angular crevices to such an extent that the strength to resist breakage by impact is greater than twenty per cent of that of the clear bulb."

Claim 2 is identical with claim 1 except that it is narrower in that it requires that the strength of the bulb to resist breakage shall be greater than 45%, instead of greater than 20%, of that of a clear bulb.

The fact that the interior bulb surface is

> "characterized by the presence of rounded as distinguished from sharp angular crevices"

is the characteristic feature of the invention of the patent, as the District Court indicated (Opinion, R. 327). It is this feature which is responsible for the strength of the bulb of the patent.

A bulb with such an interior surface having been new with Pipkin, claims directed broadly to it, without any other limitations, would have distinguished the bulb of the patent from the prior art. However, Pipkin chose to limit his claims further by specifying limits of maximum brightness (glare) and minimum strength. Thus the claims specify that the frosted interior surface of the bulb shall be such that the maximum brightness of an incandescent lamp employing such a bulb "will be less than twenty-five per cent of that of said lamp with a clear bulb."

Also, since Pipkin was interested only in an inside frosted bulb substantially stronger than prior, fragile bulbs, the claims prescribe that the strength to resist breakage of the bulb shall be "greater than forty-five per cent of that of the clear bulb" (claim 2) or at least "greater than twenty per cent of that of the clear bulb" (claim 1), compared with about 5% for inside frosted bulbs of the prior art.

Thus the claims of the Pipkin patent accurately define the novel structure of his undeniably new and valuable product, a commercially strong inside frosted bulb, characterized, as the claims particularly point out, "by the presence of rounded as distinguished from sharp angular crevices."

The Lower Court Decisions upon the Pipkin Patent

As we have previously stated, the Pipkin patent was held valid and infringed by two Circuit Courts of Appeals prior to the present case.

It was held valid by the Circuit Court of Appeals for the Sixth Circuit in *General Electric Co.* v. *Save*, 82 F. (2d) 100, over the two prior patents primarily relied upon by defendants in the present case (the Kennedy patent No. 733,972 and the Wood patent No. 1,240,398), which were also considered by the Patent Office before it granted the Pipkin patent.

It was also held valid by the Circuit Court of Appeals for the Second Circuit in *General Electric Co.* v. *Wabash*, 93 F. (2d) 671 (certiorari denied 303 U. S. 641; rehearing denied 303 U. S. 667). The defenses to validity asserted in the *Wabash* case included all those advanced in the present case.

In sustaining the patent the Second Circuit Court of Appeals stated (93 F. (2d) 671, 673):

> "* * * Although the advantages of inside frosted bulbs were recognized long before Pipkin, no one produced an inside frosted bulb with the adequate strength for commercial use.
>
> * * * * *
>
> "* * * No one seems to have found, before this inventor, that it was the sharpness of the microscopic etched surfaces that was responsible for the extraordinary weakness of the inside frosted bulb and no one before suggested that rounding them out restored the strength. Like all problems when solved, it may be argued to be simple, but where, as here, it appears that the accomplishment had eluded the search of those interested in finding its solution until this inventor's contribution, he should be accorded the fruits of a patent for his accomplishment. *Diamond Rubber Co.* v. *Consolidated Tire Co.*, 220 U. S. 428, 435, 31 S. Ct. 444, 55 L. Ed. 527."

The decision of the Circuit Court of Appeals for the Sixth Circuit in the *Save* case, was to the same effect; 82 F. (2d) 100.

In the present case, although no new defense was presented and the record did not differ in substance from the record in the *Wabash* case (the same counsel representing defendants in both cases), the District Court held the patent invalid for alleged anticipation, want of invention and indefiniteness, and also held the patent not infringed because it interpreted the claims not as product claims, which they expressly are, but as importing the particular process described in the patent, which the court said defendants did not practice.

On appeal, the Circuit Court of Appeals for the Third Circuit held the patent invalid and affirmed the judgment of the District Court dismissing the complaint. It did not discuss the defenses of non-infringement and indefiniteness, which were erroneously sustained by the District Court, but held the patent invalid because it thought the claims were for "nothing more than a product old in the art" (R. 353). The Court made this holding notwithstanding it recognized and stated in its opinion that Pipkin's discovery "was a very important one for the electric light bulb industry" (R. 352). *And even more important, the Court made this holding without stating anywhere in its opinion what previous product it had in mind.*

Actually the record shows, without contradiction, that the bulb defined by the claims of the Pipkin patent was new and constituted a very important step forward in the electric lamp bulb industry. Defendants did not even attempt to prove that a bulb responding to the claims of the Pipkin patent ever existed prior to Pipkin's invention.

Basing its opinion as it did on this bare and wholly unsupported statement that Pipkin's claims are for an old product, we submit that the court below committed a most grievous error.

Specification of Errors

Petitioner respectfully submits that the Circuit Court of Appeals for the Third Circuit erred:

1. In holding the Pipkin patent No. 1,687,510 invalid.

2. In affirming the judgment of the District Court.

3. In failing to hold the Pipkin patent valid and infringed.

Argument

I. Pipkin's patented bulb was new and his patent is valid over the prior art.

Certain facts, which cannot successfully be denied, emerge clearly from the foregoing statement. These facts lead irresistibly, we think, to the conclusion that the Pipkin patent is valid over the prior art. Therefore we summarize them here:

1. Pipkin was the first person ever to make the inside frosted bulb which he patented—an inside frosted bulb characterized by the presence of rounded as distinguished from sharp, angular crevices. No one before Pipkin ever suggested such a bulb. It was a new product or article of manufacture which had never before existed.

2. The Pipkin bulb was the first commercially strong inside frosted lamp bulb. Because of its advantages over prior bulbs, it has had great commercial success.

3. The great advantages which inside frosted bulbs would have over the existing outside frosted bulbs were fully recognized for more than twenty years before Pipkin made his invention, the inside frosting of bulbs having been suggested by a Kennedy patent (R. 257) published in 1903. However, until Pipkin's invention (his original patent ap-

plication was filed in February, 1924), no one was able to devise a satisfactory strong inside frosted lamp bulb.

4. During the years preceding Pipkin's invention many other attempts had been made to produce bulbs which would be free of glare, such as by coloring the bulb, coating the bulb with special paint, making the bulb out of special translucent glass, moulding irregularities on the outside of the bulb, and, of course, "frosting" the outside of the bulb, but none of these was satisfactory.

5. Neither the patentee Kennedy nor anyone else prior to Pipkin had any idea as to why the inside frosting of bulbs rendered them fatally weak, or what the glass structure should be to make them commercially strong, or how to make such a structure.

6. No one before Pipkin had even so much as intimated that the weakness of inside frosted bulbs was attributable to the multitude of sharp angular crevices in the etched surface or that the solution of this long-standing problem lay in rounding out these tiny crevices by a second etching treatment.

7. There were numerous disclosures prior to Pipkin, some as early as 1887, teaching that the grooves or crevices in a frosted glass surface could be rounded out by further etching. Yet not one of them contained the slightest suggestion that this rounding had any effect on the strength of the glass, or that such a surface might have any special utility on the inside of a glass bulb.

Pipkin's bulb obviously was not "an old product" nor are his patent claims for "nothing more than a product old in the art", as the Court of Appeals categorically held without any explanation, reference to or support in the record. This Court is therefore squarely faced with the necessity of determining whether Pipkin's valuable contribution to the glass bulb industry constituted invention.

Throughout the entire development of our patent law no safer or fairer guide for the judicial determination of the question of invention has ever been devised than to consider an invention in light of the history of the problem which it solved. We believe that Pipkin's invention should be so considered by this Court, as it was by the Circuit Courts of Appeals for both the Sixth and Second Circuits, and that when so considered it will be seen that invention of a high order was involved.

The matter may be briefly stated thus:

For more than twenty years numerous workers in the art sought a glass lamp bulb which would be free from glare. Many ideas were put forward, but none was satisfactory. Outside frosted lamps existed, were free of glare, and naturally suggested to the patentee Kennedy and to many others that the solution lay in frosting the bulb on the inside. But only fatally weak inside frosted bulbs resulted from these efforts. Indeed, it would seem that such efforts to solve the problem actually retarded its solution for they effectively demonstrated that a commercially strong inside frosted bulb could not be made as were outside frosted bulbs. Anyone familiar with these failures would, very naturally we think, be led away from any further attempt at frosting the inside of the bulb.

But even if they were not thus led away from the true solution, certainly one could not reasonably expect it to occur to any of them that the solution lay in such a paradox as etching away more glass from a surface known already to have been rendered hopelessly weak and fragile by the original etching. The solution of the problem required more than ordinary skill and insight or it would have found solution long before Pipkin solved it. Some appreciation of why inside frosting rendered the bulbs fatally weak was essential before any progress toward a solution could be made, and

it was left to Pipkin to make that discovery after more than twenty years during which others had failed to perceive it. But even that first step, however important it was, was by no means all that was required. Pipkin had further to conceive that the mere rounding out of the multitude of tiny sharp angular crevices would restore the strength of the bulb. He certainly got no assistance in this regard from the numerous prior disclosures of frosted glass surfaces with rounded crevices, for none of them contained the slightest suggestion that this rounding had any effect on the strength of the glass.

Looked upon in light of the long history of the problem and the admittedly great value of its ultimate solution, we respectfully submit that Pipkin's accomplishment constituted invention of a high order. And decidedly it is neither sound nor fair to look upon the invention after it has been made solely from the point of view of its simplicity.

Perhaps one of the wisest injunctions that was ever given to research workers seeking the solution of difficult technical problems was this: "When you find it, it will be simple." Many important inventions are of that character, and Pipkin's is no exception. As this Court said in *Expanded Metal Co.* v. *Bradford*, 214 U. S. 366, 381:

> "The fact that the invention seems simple after it is made does not determine the question; if this were the rule many of the most beneficial patents would be stricken down."

And as this Court recently said in *Goodyear Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 279:

> "Viewed after the event, the means Anthony adopted seem simple and such as should have been obvious to those who worked in the field, but this is not enough to negative invention. During a period of half a century, in which the use of flashlight batteries increased enormously, and the manufacturers of flashlight cells were conscious of the de-

> fects in them, no one devised a method of curing such defects. Once the method was discovered it commended itself to the public as evidenced by marked commercial success. These factors were entitled to weight in determining whether the improvement amounted to invention and should, in a close case, tip the scales in favor of patentability."

Even the Court of Appeals in this case, while holding the patent invalid, found that Pipkin's disclosure "was a very important one for the electric light bulb industry." (R. 352)

An examination of the prior patents and publications in the record clearly discloses, we believe, that this conclusion of invalidity was in error and that the Circuit Courts of Appeals for the Sixth and Second Circuits were correct in holding that Pipkin's new bulb was a meritorious invention and that the Pipkin patent for such bulb was valid.

We shall now examine the prior patents and publications in more detail.

The Kennedy Patent.

Of the many prior patents and publications in the record, only one refers in any way to the inside frosting of bulbs. This is the Kennedy patent No. 733,972 issued in 1903 (R.259), which patent was before the courts in both the *Save* case and the *Wabash* case and was also before the Patent Office (R. 222) when it originally granted the Pipkin patent. It is this Kennedy patent which the District Court erroneously concluded was an anticipation of the Pipkin patent. The Circuit Court of Appeals apparently recognized that the Kennedy patent did not touch on the Pipkin invention, because it did not mention the Kennedy patent in its opinion. Whatever may have been the basis of the Court of Appeals' decision, it seems clear that it was not the Kennedy patent.

The Kennedy patent is merely for a method of frosting the inside of a bulb, or other hollow object having openings

at each end, by forcing the frosting solution into it by means of air pressure. Its disclosure is well summarized by its first claim:

> "The herein-described method of frosting the interior surface of a hollow bulb or the like of glass and having openings at top and bottom, which consists in immersing the open lower end of the bulb into a corroding liquid and forcing the liquid to rise in the same by air-pressure, then removing said pressure and permitting the liquid to flow out of the bulb by gravity, then rinsing out the bulb with water to cleanse it of acid, and then drying the bulb."

Nothing is said in the Kennedy patent about rounded crevices or how to produce them. Nothing is said about frosting formulae, times or temperatures. Aside from the use of suction or pressure in the process, which of course does not affect the product, this is just the old frosting method which produces sharp crevices and weak bulbs.

As we have already indicated, instead of impairing the validity of the Pipkin claims, this Kennedy patent greatly strengthens them. For it shows that as early as 1903 the desirability of inside frosted bulbs was recognized. And yet it was not until Pipkin developed the bulb structure of his patent that the production of inside frosted bulbs of adequate strength was achieved.

> "In the trade this [Kennedy's] result was a failure . . . ." (C. C. A. 2 in the *Wabash* case, 93 F. 2d 671, 672).

> "Earlier attempts at inside frosting were, however, failures, due to the fact that frosting applied to the inside of bulb weakened it and made it fragile . . . ." (C. C. A. 6 in *Save* case, 82 F. 2d 100 at 101.)

> "* * * it had also been recognized that the frosted interior, although otherwise advantageous, impaired

> the strength of the bulb" (District Court opinion herein, R. 327).

But, in spite of the fact that three other tribunals, two United States Circuit Courts of Appeals and the Patent Office, had found that Pipkin made an invention over Kennedy, the District Court held Kennedy anticipatory.

This was on the theory that Kennedy's instructions,

> "although they did not specifically contemplate the multiple etching process, *did not preclude* its application" (Opinion, R. 331)

and that

> "The glass technologist, desirous of imparting to the interior of a bulb the mat surface hereinabove described, could, following the method of Kennedy, avail himself of the multiple etching process then in common use" (Opinion, R. 331).

The fact, if it be a fact, that Kennedy's instructions "did not preclude" the use of a multiple etching process is of no consequence. The question is, rather, whether Kennedy's instructions *would suggest* such a process to the normally skilled worker in the art. Would such a worker, familiar with the Kennedy patent, having tried Kennedy's process and found that the result was a fatally fragile bulb, normally have had recourse, to remedy that defect, to a multiple etching process?

We respectfully submit that the substitution of a multiple etching process for Kennedy's single etch would have been the very *last* expedient that one trying Kennedy and finding the resulting bulb fatally fragile would have been likely to try; *because he would naturally suppose that the weakness resulting from the single etch, would be accentu-*

*ated by a further etch which actually ate away more of the glass.**

The actual history of the art shows that this was true, for, desirable as the inside-frosted bulb was known to be in Kennedy's time, no one ever so much as thought of substituting a multiple etching process for Kennedy's single etch during the next 20 years. No practical inside-frosted bulbs were made until Pipkin made his invention, and thereby solved a problem that had been waiting more than 20 years for solution.

The Court of Appeals for the Second Circuit said regarding the Kennedy patent and its relation to Pipkin (*G. E.* v. *Wabash*, 93 F. 2d 671 at 672):

> "Kennedy, in a patent granted July 21, 1903 (U. S.) suggested frosting the bulbs on the inside instead of the outside, leaving the outside surface smooth. In the trade this result was a failure, and that was due to the fact that the first frost etching treatment removes only a slight amount of glass. When applied to the outside of the bulb it appears not to affect the bulb's strength but, when applied to the inside surface, it reduces it against outside impact to but a small fraction of its original value. This makes the bulb unfit for commercial use."

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* The District Court fell into a most surprising and unaccountable error when it asserted that the Kennedy method was demonstrated at the trial (Opinion, R. 331, 332). The fact is that defendants' court room demonstration *was not a demonstration of the Kennedy patent, and did not even purport to be so.* What it *did* purport to be was a demonstration of defendants' *present* method of making inside frosted bulbs (R. 100), a method devised by defendant Herzberg to achieve Pipkin's patented bulb after the Pipkin patent had taught the world the frosted structure which that bulb should have and how it could be obtained.

Having shown that Pipkin by his invention "remedies the fatal weakness of inside frosted bulbs," the Court continued (p. 673):

> *"To have accomplished this over the Kennedy patent of 1903 amounts to invention.* The claims are novel. Although the advantages of inside frosted bulbs were recognized long before Pipkin, no one produced an inside frosted bulb with the adequate strength for commercial use."

The prior disclosures of "double treatment."

The prior disclosures of "double treatment"* actually throw into strong relief the inventive nature of Pipkin's accomplishment. Therefore the true significance of these disclosures should be clearly understood.

Ever since 1887 the scientific fact has been known to glass technologists that grooves of a frosted surface can be enlarged and made more rounded by the use of dilute hydrofluoric acid, and certain technologists suggested the application of this knowledge for obtaining a decorative "satin finish" frosting or desired optical effects in connection with focusing screens for cameras and the like.

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* The prior disclosures of "double treatment" are:

The Wood U. S. patent of 1917 (R. 261);

The Correll British patent No. 166,133 of 1922, (R. 251) and the following publications:

Die Glashutte of 1887, in an article entitled "Contributions to the Knowledge of Glass Etching" (R. 273)

Sprechsaal, of 1907, in an article on the etching and ornamentation of hollow glass (R. 286); and

The Journal of Industrial and Engineering Chemistry of 1917, in an article by Tillotson covering his scientific investigation "on the relation between the physical properties and chemical composition of glass (R. 291)."

But the significant thing about these disclosures is that *none of them intimates that this rounding of the crevices is capable of having a strengthening effect on frosted glass of any kind, or that it can have any utility in connection with inside frosted electric lamp bulbs.*

And this in spite of the fact that also as early as 1903, patents were issued to inventors attempting to solve this problem of a suitable inside frosted lamp bulb. From that day until Pipkin's invention, in spite of the many efforts to solve this problem, no one conceived that such double treatment could play any part whatever in the making of practical, strong, inside frosted bulbs. The lamp industry, with which we are here concerned, gained nothing from such disclosures. It remained for Pipkin to conceive of the inside frosted bulb structure which made such lamps practical.

All of these "double treatment" disclosures were before the Second Circuit Court of Appeals in the *Wabash* case. The Wood patent, which we shall consider next, was also considered by the Patent Office before allowing the Pipkin claims, and by the Sixth Circuit Court of Appeals in the *Save* case. Those articles which were considered in the *Wabash* case, but not by these other tribunals, are merely cumulative.

(a) The Wood Patent.

The Wood patent (Ex. D-2, R. 263), is directed particularly to making focusing screens for cameras. It has nothing whatever to do with *inside* frosted lamp bulbs.

Wood starts by subjecting his smooth flat plate of glass to a blast of air carrying abrasive particles "to produce a very slight cloudiness of the surface, *which is scarcely noticeable,*" each particle of abrasive material having "however, produced a microscopical dent in the surface by chipping out a minute fragment of glass" (p. 1, lines 55-64).

He then subjects this surface to the action of an acid "which enlarges and smooths out the pits made by the emery dust grains into minute concave *lenses*" (p. 1, lines 66-68), as illustrated in Figs. 5 and 6. Although Wood states that "the diffusing power of a plate prepared in this way is fully equal to that of the usual ground glass" (p. 1, lines 84-86), it is clear that he was using "diffusing" in a sense entirely different from the reduction of maximum brightness or glare, which is the purpose of diffusion in a frosted lamp bulb, because he goes on to state (lines 86-98) that with his surface,

> "*the intensity of the transmitted light is very nearly double that transmitted by such ground glass.*
>
> "When placed before a dark background, and illuminated, *my glass appears very nearly as black as ordinary untreated glass, in contrast to the milky white appearance of ordinary ground glass.* This makes it of great value as a focusing screen for cameras. The image formed by the lens upon a glass screen prepared in this way, is by actual measurement *double the brilliancy of the image seen on ordinary ground glass.*"

In referring to the fields of use of his screen, Wood says (lines 102-105):

> "It is of especial value in the case of cameras of the Graflex type, which suffer somewhat from insufficient brilliancy of the image on the focusing screen."

And he adds, casually (lines 106-111):

> "Such a screen is also useful for rendering the bulbs of incandescent lamps diffusing without at the same time causing the very marked loss in the efficiency of the lamp, *which results from frosting the bulbs in the usual manner.*"

Thus it is apparent that Wood was dealing with an entirely different problem from that which Pipkin subse-

quently solved. Wood was concerned only with optical effects. He wanted an optical effect different from that produced by ordinary frosting. He was seeking "brilliancy of the image," the opposite of the end sought in frosting lamp bulbs.

And although he went so far as to suggest that such a screen might be "useful for rendering the bulbs of incandescent lamps diffusing," etc., he did not even hint at the idea of applying his process to the *inside* frosting of bulbs, which would obviously be difficult if not impossible to do.

Furthermore, *Wood had no conception that his second treatment was capable of strengthening anything.* He was not faced with any problem of increasing the strength of frosted camera screens or of increasing the strength of the ordinary frosted incandescent lamps which were at that time frosted on the outside and, like the camera screens, involved no problem of weakness.

In short, the Wood patent did not teach or even suggest the Pipkin invention, and it did not advance the art one iota in the quest for a strong inside frosted bulb.

The District Court says in its opinion (R. 333) that Wood's patent:

> "although directed to a method, describes in detail a smooth mat surface, equivalent to that defined by Pipkin, resulting from its application. There is no critical distinction, unless the descriptive language used can be so regarded, between this disclosure and that of the claims in suit."

We respectfully urge that this statement is erroneous.

Even if Wood's surface were the same as the surface which Pipkin adopted for his new bulb,* this would be im-

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* The uncontradicted testimony of Spencer is that the Wood surface would not be sufficiently glare-reducing to meet the terms of the Pipkin claims (R. 58, 62). Wood was seeking "brilliancy of image."

material, because *the Pipkin claims are for an inside frosted lamp bulb,* and Wood had no idea of applying his lens-like surface to the inside of a lamp bulb, or any idea that such a surface would remedy the inherent weakness of such a bulb.

As the Second Circuit Court of Appeals stated in the *Wabash* case (93 F. 2d 671, 673):

> "Wood concerned himself with optical effects, but had no conception of the second treatment as a strengthening quality, and he did suggest that such a screen might be useful for rendering the bulbs of the incandescent lamps diffusing, but he did not intimate or hint at the idea of applying his process to the inside frosting of the bulbs for strength. No such problem confronted him and, as said in General Electric Co. *v.* Save Sales Co., supra, he did not advance the art in the quest for a strong inside frosted bulb."

(b) *The other "double treatment" disclosures add nothing to the Wood disclosure.*

As we have said, the other double treatment disclosures are merely cumulative. All of them are concerned only with the optical or decorative effect of the double treatment process. None of them says anything about *strengthening* an etched article, or about the treatment of *lamp bulbs* in any way, to say nothing of the *inside* frosting of such bulbs. All of these "double treatment" disclosures were before the Circuit Court of Appeals for the Second Circuit in the *Wabash* case when it sustained the Pipkin patent.

The *Correll* British patent 166,133 of 1922 (R. 251) is for "Improvements in and relating to 'Screens' and 'Sheets' and the like for the Reception of Optically-projected Pictures, Images and the Like." The initial etching may be done by acid treatment, sandblasting or equivalent. The second step for "reducing or clearing such surface" is done with hydrofluoric acid (p. 1, lines 52-56). The patentee says that this produces a "slightly diffusive surface ex-

hibiting a satin-like 'sheen' " (p. 2, lines 15, 16) which makes "a very efficient form of 'screen' " on which the image appears "much brighter under similar projection conditions or arrangement than the image formed on an ordinary white 'sheet' or 'screen' as commonly used" (lines 82-93).

The *Glashutte* article of 1887 (R. 273) discloses that a frosted surface upon being "clear-etched" with dilute hydrofluoric acid becomes brighter, as the trough-like depressed areas are "widened" and given a "more rounded shape" and that *"these troughs, owing to their more rounded shape, cannot scatter light so well as sharp edged etchings"* (R. 278, lines 89-91).

The *Sprechsaal* article of 1907 (R. 286) on the etching of glassware for decorative purposes, points out that the second treatment with dilute acid makes an etched surface "more lustrous" and gives it "a silk-like appearance" (R. 287, line 72).

And finally, the *Tillotson* article of 1917 (R. 291) sets forth in detail, and illustrates with photomicrographs the scientific fact alluded to by Wood and the others, that the treatment of an etched surface with dilute hydrofluoric acid results in "enlarging and rounding out of the 'valleys,' finally resulting * * * in a series of smooth 'saucer-like' depressions," (R. 293) or in other words, the "concave lenses" of Wood.

Although the Circuit Court of Appeals below held the Pipkin patent invalid and made the statement that the bulb claimed in the Pipkin patent was old (which statement is refuted by the record and to us is inexplicable), it quite correctly summarized and dismissed these prior "double treatment" disclosures by stating (R. 351):

> "In the prior art hydrofluoric acid was put upon the glass, already etched or frosted, for the purpose of giving it a fine 'satin' finish or 'matt.' But nothing in the prior art suggested Pipkin's paradox that by destroying more glass the bulb would be strengthened."

And as the Circuit Court of Appeals for the Second Circuit stated:

> "But no one before suggested or intimated that the rounding of the crevices was capable of having a strengthening effect on the frosted glass of any kind or that it could have any utility in connection with inside frosted electric lamp bulbs." (C. C. A. 2, *G. E.* v. *Wabash*, 93 F. 2d 671, 673.)

That these prior descriptions of "satin finish" frosting did not, in fact, teach the worker in the incandescent lamp business the requisites for making a strong inside frosted bulb, is not surprising. A person trying to make such a bulb would naturally use the frosting methods which had long been used to make outside frosted bulbs. *When this resulted in a weak bulb there was no reason for him to think that a frosting such as that produced by "double treatment" would be desirable.* Indeed, the natural conclusion would be to the contrary, because it was known that a frosted surface with this rounded structure did not reduce glare as much as did ordinary frosting.* *Except for its strength, the rounded crevice structure is a worse surface for diffusing lamp bulb purposes than ordinary frosting,* and Pipkin had to sacrifice some diffusion in order to obtain the strength which he discovered the rounded structure gave.

Likewise there was no recognition of the fact that the shape of the extremely minute crevices produced by frosting were responsible for the weakness of inside frosted bulbs, and even less reason to suppose that rounding these crevices, thus further widening and deepening them would restore the strength of the bulb. Indeed, it would be natural to suppose that removing more glass would further weaken the bulb.

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*See for instance Die Glashutte, No. 4, p. 50 (Ex. D-3, R. 278), which states at lines 89-91, "however these troughs owing to their more rounded shape, cannot scatter the light so well as sharp-edged etchings."

As the Court of Appeals for the Sixth Circuit said in the *Save* case, 82 F. 2d 100, at 103:

> *"it was clearly not obvious that the removal of additional material from an already weakened lamp bulb would strengthen it."*

Even now it is difficult to understand how a slight modification in the shape of these minute crevices, which are so tiny that there are from six to seven million of them to the square inch of frosted surface, can so tremendously affect the strength of a lamp bulb.

The prior double treatment disclosures merely emphasize the non-obviousness of Pipkin's new bulb, because they show that means for obtaining frosting with rounded crevices were known as early as 1887, but no one prior to Pipkin recognized that the answer to the problem of constructing a commercially strong inside frosted lamp bulb was to make such a bulb with frosting of this rounded crevice character.*

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* The remaining items of prior art found in the record are so far removed from Pipkin's invention that they do not seem to warrant detailed consideration here. The extracts from "Sprechsaal" and from "Hohlbaum" translated and reproduced at R. 296-303, are routine comments on the frost etching process and have nothing to do with rounded crevices or with inside frosted lamp bulbs.

The Webb, Archer and Harrison patents (R. 245, 247, 265) relate to ornamented or molded glass and have no relevance whatever to the Pipkin patent or to the problem that Pipkin solved. The District Court dismissed them with a brief reference in its opinion (R. 331) and the Circuit Court of Appeals apparently agreed that these patents are irrelevant, and did not mention them in its opinion.

The District Court erred in holding that these "double treatment" disclosures invalidated the Pipkin Patent for a new inside frosted lamp bulb.

The District Court's opinion states (p. 335):

> "The claim to invention here rests upon the fact, fully accepted by the parties, that no one prior to Pipkin had perceived that the interior mat surface 'characterized by the presence of rounded as distinguished from sharp angular crevices' increased the resistance of a frosted glass bulb to breakage. This fact neither enhances the claim to invention nor impairs the disclosures of the prior art. The discovery of this peculiar property, inherent in the physical characteristics of the mat surface, was not a patentable 'discovery' within the meaning of the statute."

We respectfully submit that this statement by the District Court contains a vital error. The claim to invention here does *not* rest upon the mere discovery of a "peculiar property, inherent in the physical characteristics of a mat surface." It may well be that such a mere discovery is not patentable in and of itself, as the District Court states. *However,* when, as in the present case, the discoverer of that peculiar property puts that discovery to use by creating a new article which was an important step forward in the industry, and the answer to a long-felt want, such a person has made a patentable invention of a high order.

> "The elements of the power exist; *the invention is not in discovering them, but in applying them to useful objects* . . .
>
> *"A new property discovered in matter, when practically applied, in the construction of a useful article of commerce or manufacture is patentable;"* *LeRoy* v. *Tatham*, 14 How. 156, 175.

This is exactly what Pipkin did. He discovered that a frosted glass surface characterized by the presence of rounded as distinguished from sharp angular crevices, was vastly stronger to resist breakage than a frosted surface characterized by sharp angular crevices, a fact theretofore unknown and unsuspected. Pipkin put his discovery to use by creating a new inside frosted electric light bulb wherein the strength-giving quality of this form of surface was used to advantage, and he patented this new bulb.

The District Court held, however, that (R. 335):

> "the adaptation of the mat surface to a new use to which it was readily adaptable by reason of this peculiar property, was not a patentable 'invention.'"

In support of its views on this point the District Court relied mainly on *Ansonia Brass Co.* v. *Electrical Supply Co.*, 144 U. S. 11, from which it quotes at length at R. 336.

The *Ansonia* case is not in point and the vital differences between that case and the present case serve only to emphasize the validity of the Pipkin patent.

In the *Ansonia* case the patent related to an insulated and non-combustible covering for electrical conductors. The evidence showed that one Holmes had previously manufactured electrical conductors having the same sort of insulated and non-combustible covering which the patent described, but that his product had been used only for burglar alarm wires, in which the currents carried were not heavy enough to make incombustibility of the covering a matter of consequence.

The holding was, naturally, that the patent was invalid. In spite of the fact that the insulator used by Holmes "was not intended to be, and perhaps was not known to be, incombustible" (p. 17), it was in fact the same as that covered by the patent, and the two insulators being

> "practically the same in their method of construction, it is clear that Cowles has no right to claim the feature of incombustibility as his invention . . ." (p. 18).

In the *Ansonia* case the patentee created nothing new; he merely observed the advantageous properties of an old article of manufacture.

In the present case Pipkin *created a new article of manufacture*, an inside-frosted bulb having an etched inner surface characterized by rounded as distinguished from sharp angular crevices, a thing that had never existed or ever been suggested before.

The question which must be decided here is not the question raised in the *Ansonia* case at all, but the question whether Pipkin made an invention in first discovering the property of strength in the prior mat surfaces, which had not been apparent to anyone for almost fifty years, and then adapting a surface of this character to such a highly useful article as an inside frosted light bulb.

As was said many years ago in *Strong et al.* v. *Noble et al.*, 6 Blatchford 477:

> "There is scarcely a patent granted that does not involve the application of an old thing to a new use, and that does not, in one sense, fail to involve anything more. But the merit consists in being the first to make the application, and the first to show how it can be made, and the first to show that there is utility in making it."

The District Court did not reach the heart of the matter at all when it held that "the adaptation of the mat surface to a new use *to which it was readily adaptable by reason of this peculiar property*, was not a patentable 'invention.'" If it had been so obvious to use the old mat surface for Pipkin's purpose, certainly some one would have done it during the many years that intervened before Pipkin's discovery of its usefulness in a lamp bulb. As we have previously shown, Pipkin's accomplishment should be viewed in light of the long history of the problem which it ultimately solved and not by hindsight. The verdict of that history is that he saw what was not obvious to other men skilled in the art and that he was entitled to the reward of a valid patent.

II. The Pipkin Claims Are in the Proper Technical Form.

The District Court also concluded that the claims in suit were functional and indefinite. On appeal, the Circuit Court of Appeals did not pass upon this defense, which we believe to be wholly without merit. This same defense was presented by defendants in the *Save* case in the Sixth Circuit, and the court rejected it with the remark that the claims "are very precisely defined." The same defense was also advanced in the Second Circuit case, but was abandoned and not argued by counsel on appeal.

The claims* call for the following four elements:

1. "A glass electric lamp bulb having its interior surface frosted by etching."

2. The "maximum brightness of an ordinary incandescent lamp comprising such a bulb will be less than 25% of that of said lamp with a clear bulb."

3. "Said interior bulb surface being characterized by the presence of rounded as distinguished from sharp angular crevices."

4. "The strength to resist breakage by impact is greater than 20% of that of the clear bulb" (in claim 2 the figure is 45%).

We submit that these claims are not functional and that the Sixth Circuit Court of Appeals was obviously right when it said that the Pipkin claims "are very precisely defined." (82 F. 2d 100, 103.)

The District Court's finding of fact VIII seems to embody the basis for its holding that the claims are "functional." We believe that court completely misunderstood what constitutes a functional claim and why such a claim is not allowed.

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* For the claims, see page 9 of this brief.

Finding VIII reads as follows (R. 346):

> "There was nothing which distinguished the mat surface defined by Pipkin from the mat surface described by those who preceded him except the functions ascribed to it and the particular article of manufacture, to wit, diffusion of light and resistance to breakage. The novelty of the invention, if any, lay, not in the structural elements, but in their function. The claims in suit are, therefore, void."

In these sentences the Court is apparently saying that since a frosted glass *surface* with rounded crevices had previously been applied to certain articles other than lamp bulbs and for a different purpose, Pipkin's patent for a new bulb incorporating such a surface was merely for another "function" of such a surface and therefore the claims were "functional." In making such a holding, the District Court confused the question of invention in putting an old surface to a new use (to which we have already addressed ourselves) with the technical question of proper *definition* of the invention in the claims, with which the doctrine of functional claims is concerned.

The District Court thought that the case of *General Electric Co.* v. *Wabash Appliance Corp.*, 304 U. S. 364, supported its position that these claims are void (Opinion, R. 340-342).

But the form of the claim held void by this Court in that case was entirely different from that of the Pipkin claims.

In the *Wabash Appliance* case, which involved the Pacz filament patent, the claim read as follows:

> "25. A filament for electric incandescent lamps or other devices, composed substantially of tungsten and made up mainly of a number of comparatively large grains of such size and contour as to prevent substantial sagging and offsetting during a normal or commercially useful life for such a lamp or other device." (304 U. S. 368.)

The difficulty with that claim was that filaments "composed substantially of tungsten and made up mainly of a number of comparatively large grains" were old in the art; and that, therefore, the use of this phrase was not sufficient to prevent anticipation by the prior art. Thus the only language in the claim which served to distinguish the patentee's filament from prior filaments was the functional requirement that the grains were to be "of such size and contour as to prevent substantial sagging and offsetting".

This was made clear by the Court, when it said (304 U. S. 364 at 369):

> "The tungsten filament 'made up mainly of a number of comparatively large grains,' differentiates the claimed invention from tungsten drawn into a single crystal . . . , and from Coolidge's fine-grained thoriated filament, *but serves aptly to describe the product of earlier manufacture, with its large regular grains subject to offsetting.*"

The Court held that the attempt to differentiate from the prior art solely by specifying that the effect of the grains in question was "to prevent substantial sagging and offsetting," rendered the claim void as "functional," because the claim used only

> "conveniently functional language *at the exact point of novelty*" (p. 371).

And the Court continued:

> "A limited use of terms of effect or result, which accurately define the essential qualities of a product to one skilled in the art, may in some instances be permissible and even desirable, but *a characteristic essential to novelty may not be distinguished from the old art solely by its tendency to remedy the problems in the art met by the patent.*"

In the present case the claims *structurally* distinguish Pipkin's bulbs from the prior art by the requirement that "said interior bulb surface" shall be "characterized by the presence of rounded as distinguished from sharp angular crevices."

The fundamental difference between the present case and that involving the Pacz patent is that the phrase in the latter, "made up mainly of a number of comparatively large grains," did *not* differentiate from the prior art; whereas the phrase of the Pipkin claims "said interior bulb surface being characterized by the presence of rounded as distinguished from sharp angular crevices" *does* distinguish the Pipkin bulb from all prior art bulbs.

The claim in the Pacz patent was held void because it expressed the "*exact point of novelty*" *only in functional terms*, "of such size and contour as to prevent substantial sagging and offsetting."

But the Pipkin claims are subject to no such vice. They define the invention in *terms of structure* "at the exact point of novelty"; i. e., the character of the interior surface of the bulb, which is "characterized by the presence of rounded as distinguished from sharp angular crevices."

Pipkin gave a clear, non-functional, structural definition of the frosted interior surface of his new bulb, which structural definition clearly distinguished his new bulb from all previous inside frosted bulbs. And in addition he chose further to limit his claims by incorporating in them limits of brightness and strength, in measurable quantitative values.

The distinction between "rounded" and "sharp angular crevices" was well recognized in the art, as shown by the *Glashutte* and *Tillotson* articles (R. 278 and 293), which used substantially identical terms, and the *Tillotson* article illustrated such terms by photomicrographs.

Claims have been frequently sustained which use similar language defining a characteristic or quality of the invention.

In *Eibel Process* v. *Minnesota*, 261 U. S. 45, the Court sustained a number of claims much less definite than the claims here in suit. Claim 1 of the *Eibel* case is typical and thus (p. 50):

> "1. A Fourdrinier machine having the breast-roll end of the paper-making wire maintained at a substantial elevation above the level, whereby the stock is caused to travel by gravity, rapidly, in the direction of movement of the wire, and at a speed approximately equal to the speed of the wire, substantially as described."

In sustaining this claim over the defense of "indefiniteness" the Court said (p. 66):

> "Expressions quite as indefinite as 'high' and 'substantial' in describing an invention or discovery in patent specifications and claims have been recognized by this Court as sufficient."

In *Allen Filter* v. *Star Metal* (C. C. A. 3), 40 F. 2d 252, certiorari denied 282 U. S. 848, claims were sustained which differed from the prior art by calling for "resilient" coils, against a contention that such claims were too indefinite. The Court stated at p. 254:

> "Nor is patentability defeated because the boundary line between coils coming within the patent and those falling outside it is not marked with equatorial precision. It would have been difficult, if not impossible, to mark it more definitely. It is as fixed and certain as was the boundary in Van Heusen Products *v.* Earl & Wilson (D. C.) 300 F. 922. It is sufficiently obvious to enable those skilled in the art to locate it. The law requires nothing more."

There is no merit in defendants' highly technical contention that the claims are invalid for indefiniteness or functionality.

III. Defendants' Bulbs Infringe the Pipkin Patent.

As we have seen, the claims of the Pipkin patent contain the following four elements:

1. "A glass electric lamp bulb having its interior surface frosted by etching."

2. The "maximum brightness of an ordinary incandescent lamp comprising such a bulb will be less than 25% of that of said lamp with a clear bulb."

3. "Said interior bulb surface being characterized by the presence of rounded as distinguished from sharp angular crevices."

4. "The strength to resist breakage by impact is greater than 20% of that of the clear bulb" (in claim 2 the figure is 45%).

Defendants' bulbs clearly infringe both of these claims.

Defendant Jewel Incandescent Lamp Company manufactures lamps employing the accused bulb, and defendant Nulite Electric Company, a wholly owned subsidiary of Jewel (R. 7), sells these lamps (R. 8).

It is significant that the Jewel Company's inside-frosting operations were initiated by former employees of the plaintiff who had been familiar with the inside-frosting operations carried on by plaintiff under the patent. These men were the individual defendant Herzberg, organizer and general manager of the Jewel Company (R. 86, 87) and Ambrunn, who participated in a demonstration of defendants' operations during the trial. Herzberg was formerly factory manager of one of *plaintiff's* factories and there became familiar with plaintiff's inside-frosting operations (R. 106, 107). Ambrunn formerly worked in the plaintiff's frosting department (R. 109).

Herzberg and Ambrunn are designated as joint inventors in the Herzberg and Ambrunn patent No. 2,025,588, applied for in 1933 and issued in 1935 (R. 311) which, it is asserted, describes defendants' frosting procedure (R. 99, 115).

Specimens of defendants' accused bulb are in evidence as Plffs. Exs. P-17 and P-18 (R. 31, 32).

A collection of photomicrographs of the frosted interior surface of defendants' bulbs is in evidence as Plffs. Ex. P-19 (R. 39), one of these photographs being reproduced in the printed record (R. 155). For comparison a collection of photomicrographs of the interior-frosted surface of plaintiff's commercial bulbs made under the Pipkin patent is in evidence as Plffs. Ex. P-16 (R. 25), one of these photographs being reproduced in the printed record (R. 151).

Although defendants' expert attempted to draw certain minor distinctions between the surface of defendants' bulbs and that of plaintiff's bulbs, the District Court, after hearing the experts and examining the photomicrographs, some of them with the aid of a stereoscopic apparatus (R. 68-70), found that defendants' interior-frosted surface is in fact

> "characterized by the presence of rounded as distinguished from sharp angular crevices" (opinion, R. 343).

Since this finding was amply supported by the evidence (R. 37, 39, 68), and since it is admitted (R. 8) that defendants' bulbs are frosted by etching, it is established that, so far as the character of the surface is concerned, defendants' bulbs respond to the requirements of the claims in suit.

Also, it was proved, and not disputed, that defendants' bulbs conform to the requirements of the claims as to maximum brightness and as to strength.

The claims require that the maximum brightness (glare) of an incandescent lamp employing the bulb of the patent

shall be less than 25% of that of the same lamp with a clear bulb. The maximum brightness of defendants' 25 watt lamps with the frosted interior averages only 3.2 units as against 194 units maximum brightness for the same lamps with clear bulbs (R. 35); and the maximum brightness of defendants' 40 watt lamps with the frosted interior averages only 5.4 units as against 366.9 units maximum brightness for the same lamps with clear bulbs (R. 36). Thus the maximum brightness of defendants' lamps is much less than 25% of that of the same lamp with a clear bulb and fully complies with the requirement of the claims in this regard.

The claims further require that the strength to resist breakage of the bulb shall be greater than 20% (claim 1), or greater than 45% (claim 2) of that of a clear bulb. The average strength of defendants' inside-frosted 25 watt lamps covered by the test report at R. 35 was 32.4 units and that of defendants' 40 watt lamps covered by the test report at R. 36 was 29.6 units; whereas the strength of corresponding clear bulbs as measured by the same bump-testing apparatus averaged 52 and 47 units, respectively (R. 37). Thus the strength of these inside frosted bulbs was greatly in excess of the value required by the claims.

It is, thus, apparent not only that defendants' lamps have the type of inside-frosted surface defined in the claims, but also that they conform to all the other requirements of the claims.

It follows that defendants' bulbs infringe the patent.

But the District Court held otherwise.

Basis of the District Court's holding of non-infringement.

The District Court held that defendants' bulbs did not infringe, on the ground that

> "the mat surface of the accused structure, as well as the mat surface of the structure manufactured by the plaintiff, is substantially identical with the mat

surface of the prior art. [The frosting referred to in the prior art 'double treatment' disclosure showing the etching of such things as camera screens, etc.] If this is the mat surface defined by Pipkin in his claims, there can be no infringement" (Opinion, R. 342).

In this holding, as elsewhere throughout its opinion, the District Court entirely loses sight of the fact that the Pipkin patent is not for "a mat surface"; it is for a *new lamp bulb*, with a particular structure. Such a bulb never existed before Pipkin's invention, despite the long felt need for such a bulb, and defendants have paid Pipkin's invention the tribute of imitation and infringement.

In addition to assigning this erroneous reason for its holding of "non-infringement," which, of course, is simply a repetition of its mistaken views of invalidity, the District Court also held (R. 342, 343) that the claims of the Pipkin patent must be construed to embrace the particular frosting method recommended in the specification of the patent (although the claims are expressly article claims and are not limited in any way to any particular process) and that the Jewel lamp "is not manufactured under the method embraced in the claims. . . ."

The District Court, we respectfully submit, erred both in the assertion that the claims in suit "are so drafted as necessarily to embrace the chemical process by which the defined result is produced," and also, if the point be material, in holding that defendants' bulb is not manufactured by that method, as we shall show.

The claims are not limited to the process disclosed in the patent.

In holding that the Pipkin claims are, in effect, process claims and limited to the process disclosed in the patent, the District Court made, in our opinion, an error of law. Its view on this point is directly contrary to that of the two

Courts of Appeals which had previously considered the Pipkin patent.

The Court of Appeals for the Sixth Circuit said in the *Save* case, 82 F. 2d 100, 102, 103:

> "It is important to note that both of Pipkin's claims cover a product and not a method."
>
> • • • • • •
>
> "Just as an old process may be practiced by a new machine, or a new process by machinery which may be either old or new, just so a new article of commerce may involve the exercise of the inventive faculty even though in producing it a known method is resorted to."

Similarly, the Court of Appeals for the Second Circuit said in its opinion in the *Wabash* case, 93 F. 2d 671, 672:

> "The patent gives the formula which may be used for the frosting solution and the strengthening solution. *The claims, however, are directed to the product—the bulb structure itself.*"

The District Court advances as a reason for its view the assertion that the claims contain "an explicit reference to the etching process as the only means by which the result may be produced" (R. 329).

But the claims say nothing in regard to process except as they say that the interior surface of the bulb "is frosted by etching," which is very far from requiring that the product shall be produced by any *particular* etching process; and the requirement that the bulbs are to "be frosted by etching" does not differentiate the claims from defendants' bulbs, for defendants' bulbs are admittedly frosted by etching (Stip. R. 8).*

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* Use of the term "frosted by etching" does not import a process into the claim. The language is descriptive of the kind of surface, that is one which is eaten away as distinguished from one having an "application of coatings" (R. 141 l. 23).

The District Court also said that "the process and the result are so interrelated that they are inseparable" (R. 328).

We see no basis for this assertion. Even if it be assumed that a two-step process, such as that disclosed in the patent, was the only known method of producing an etched surface with rounded crevices, a different process might have been discovered the next day, or may be discovered tomorrow, for producing the rounded crevices, once Pipkin had taught that a bulb with such crevices was desirable. And, indeed, if the District Court be correct in holding that a surface "characterized by the presence of rounded as distinguished from sharp angular crevices" (which the Court finds defendants' bulbs to have), is produced by defendants by a method different from that described in the Pipkin patent, *that fact of itself negates the proposition that the "process and result are so interrelated that they are inseparable."**

An inventor who produces a new product is entitled to a patent covering that new product as an article of manufacture, regardless of the process used in its manufacture, and regardless of the question whether that process be new or old.

> "This is a product patent, and we think the court below fell into error in limiting it because the process of manufacture was disclosed in the patent. A product patent may not be limited to the exact process disclosed [citing cases]." *Hookless Fastener Co. v. Prentice Mfg. Co.*, 75 F. 2d 264, 266 (C. C. A. 2).
>
> "In our judgment, it is very clear that the claim is not restricted to the product made by the described

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* It is of interest in this connection that just prior to the issuance of his patent Pipkin cancelled his process claims which had been allowed by the Patent Office "to avoid any possible contention that the article claims are to be limited by the method claims." (Patent file history, R. 238).

process, but covers the chemical individual, however produced. We know of no rule requiring a construction limiting a claim for a chemical product to the described process, because the evidence shows that it cannot be made in any other way than by the process recited. No warrant for such a rule is to be found either in the statute or in the decisions:" *Mauver* v. *Dickerson,* 113 Fed. 870, 874 (C. C. A. 3).

"Certain it is, in view of the weight of authority and the latest decisions, that the inventor of a new and useful product or article of manufacture may have a patent which covers it and gives a monopoly upon it regardless of great variations in the method of making (citing cases) and that in the ordinary and typical case, the method and the product are separable inventions. . . ." *Dunn* v. *Toronto,* 259 Fed. 258, 261 (C. C. A. 6).

Defendants' method is in fact the two-step method described by Pipkin.

For the reasons stated in the preceding section, we think it quite immaterial whether the defendants' process is the same as that described in the patent or not. It is sufficient that, as the District Court found, defendants' bulb as a product has the interior surface of the patent "characterized by the presence of rounded as distinguished from sharp angular crevices" (R. 343). But, in fact, the method by which defendants produce this surface is a two-step etching process like that of Pipkin; and this is shown by defendants' own expert testimony and by the Herzberg et al. patent (R. 311) which admittedly discloses defendants' commercial process (R. 99, 115) and which repeatedly refers to its "*second treatment*" (R. 311, Col. 2, lines 12, 47 and 48) and "*second step*" (R. 312, Col. 1, line 24).

Defendants' process as described by their witness Herzberg at R. 92, 93, 95, 96, 102 and 103, consists of the following steps:

First: The bulb is sprayed internally with a *special* acid frosting solution the formula of which is stated in the Herzberg et al. patent at R. 311.* This first step obviously is, and is admitted to be, the first etching treatment of the Pipkin patent (R. 93).

Second: Following the first treatment, the interior of the bulb, to which adheres a portion of the acid frosting solution from the frosting step, is subjected to a second treatment which consists of spraying hot water into it several times for a few seconds each time (R. 93, 95, 102, 103), the hot water being carefully maintained at a temperature of 180° F. (R. 93). It is "*compulsory* to have that hot in our operation" (Herzberg, R. 93).

Third: There then follows a washing treatment in which the bulb is washed out with cold water (R. 96).

It is essential to note that there is left adhering to the interior walls of the bulb after the first treatment a mass of the etching solution, which sticks to the walls of the bulb because of its viscosity.

If the second step of defendants' process consisted in merely spraying the interior of the bulb with *cold* water, this residual material would be merely washed out without acting further on the glass, and the bulb would be a fatally weak bulb, as defendants took the pains to demonstrate at the trial (Herzberg, R. 104).**

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* Herzberg testified that the hydrofluoric acid referred to in the formula "as 10% solution" is, in fact, a *60%* solution and that the patent was in error in this respect (R. 115).

** The bulb of the demonstration in which cold water was used instead of hot water "smashed at 5 on the bump tester," while a similar bulb in which defendants' "hot water" treatment was used did not shatter until 45 on the bump tester (R. 104, 105), thus showing almost as great strength as that of a clear bulb (R. 26, 37).

But what actually happens in defendants' second treatment is very different from merely washing. The reason why the use of very hot water (180° F.) is "compulsory" in that treatment, as plainly stated in the Herzberg et al. patent and also definitely admitted by defendants' expert, is that this extremely hot water, *combining with the special etching solution which sticks to the walls of the bulb, forms a dilute solution of the material, which, though dilute, yet is active enough chemically because of the heat of the water and the strength of the original solution, so that it eats away more glass, and rounds the theretofore sharp angular crevices of the surface.* Thus defendants' second treatment produces the same rounded crevices and the same strengthening effect in the same way that the second treatment of the Pipkin patent with the dilute etching solution accomplishes that result.

As *defendants'* expert Allen said (R. 131):

> "you can get the same effect with a dilute acid at a higher temperature that you get with a more concentrated acid as the temperature is lowered."

Allen's testimony on this subject is worth quoting in detail. He testified (R. 131, 132):

> "I interpret that the weak acid which has been present from the etch which remained in the bulb when the hot water was applied to it—that it acted in the same way that the weaker acid acted in etching the experimental bulb which was only etched with a 50% acid. *In other words, it tends to eat out a flattened area between these crystals.* . . . Now, when you take the experimental bulb which was etched in the same way, but rinsed *in cold water* . . . we see that *the sharp angular crevices at the bottom do persist,* and I think that the technical, scientific reason for that is this: that there is a reciprocity law, well-known in chemistry, that concentration of a

reagent and temperature are interrelated. That is, *that you can get the same effect with a dilute acid at a higher temperature that you get with a more concentrated acid as the temperature is lowered.*

"When this etched bulb therefore was washed in cold water, the cold water washed out the acid at a temperature which did not allow the concentration of the acid to operate to do further etching, and therefore there is naturally a weakened bulb; *whereas in the case of the warm water etch, the acid has tended to flatten out the space between.*"

Defendants' own expert witness thus testified, in effect, that the second treatment of defendants' bulbs, with the hot water combining with the acid remaining in the interior of the bulbs after the first treatment, performs the same function as the second treatment described in the Pipkin patent, namely, a further etching, which tends to flatten, that is, to round the crevices between the projections of the surface.

Also the Herzberg et al. patent (R. 311), which defendants assert to be descriptive of the process which they employ (R. 99), plainly says that in defendants' process the first etching treatment "is followed by a treatment applying heat and moisture" (page 1, col. 2, lines 11, 12) which the patent correctly refers to as "*the second treatment*" (page 1, col. 2, lines 13, 47 and 48), and that the value and effect of this "second treatment"

> "is to be ascribed *mainly to the effects of heat upon the residue of the etching mixture, making it more active*" (Herzberg et al. patent, page 1, col. 2, lines 51-53).

The Herzberg et al. patent says that

> "if the water applied in the *second step* of the process is much below 150° F. the bulb will be weak and easily broken. In fact, we prefer to heat the water

> used in this treatment to about 180° F. or even considerably higher" (Herzberg et al. patent, page 2, col. 1, lines 23-28).

Thus defendants' process is *not*, as they now assert, a one-step process, but on the contrary it is a two-step process followed by washing like the process described by Pipkin in his patent as the prefererd method for making his new bulb.

The second step of defendants' process, like that of Pipkin, is a treatment in which the etching solution used is more dilute than that used in the first treatment. Defendants merely dilute the solution used in their second treatment to a greater degree than Pipkin proposes and compensate for the greater dilution by raising the temperature of the water, in order to make the solution, dilute as it is, chemically active enough so that it will do the same work of rounding the crevices which Pipkin's second treatment does.

Defendants' method is in all substance the same as that set forth in the Pipkin patent; and indeed the District Court, itself, in effect, held it so when it said (R. 332):

> "It seems obvious that the rinsing, as thus carried out, is equivalent to washing with a hot solution of dilute hydrofluoric acid; the etching solution remaining on the etched surface becomes the active ingredient of the rinse."

We respectfully submit that the District Court erred in holding that defendants' bulbs did not infringe the patent. The court erred, first, because it erroneously held that the claims, although expressed to be for a product, are, nevertheless, limited to a product made by the method described in the Pipkin patent; and, it erred secondly, because even if the first branch of the Court's theory were correct, defendants' method of producing their bulb surface is actually in all substance the two-step etching method described in the Pipkin patent.

Conclusion

In many cases the alleged invention has come into the art as soon as there was a demand for it and the Court is obliged to speculate as to whether or not it would have been obvious to the man skilled in the art if his attention had been sooner directed to the problem. In such cases the subsequent commercial success of the invention is not related to the past history of the problem and has little evidentiary value in aiding the Court in its speculation.

In other types of cases the history of the art demonstrates, as it does here, that the improvement was entirely beyond the reach of those skilled in the art. In such cases the practical failure of other workers coupled with the immediate and practical success of the patentee's improvement historically *demonstrates invention as a fact.* In such cases the Court does not have to speculate about invention; the law accepts the verdict of history no matter how simple the invention may seem in the light of hindsight.

Thus, in *Potts* v. *Creager*, 155 U. S. 597, 608, this Court said:

> "The apparent simplicity of a new device often leads an inexperienced person to think that it would have occurred to any one familiar with the subject; *but the decisive answer is that with dozens and perhaps hundreds of others laboring in the same field, it had never occurred to any one before.* The practised eye of an ordinary mechanic may be safely trusted to see what ought to be apparent to every one."

Again, in *Loom Co.* v. *Higgins*, 105 U. S. 580, 591, this Court said:

> "But it is plain from the evidence, and from the very fact that it was not sooner adopted and used, that it did not, for years, occur in this light to even the most skilful persons. It may have been under their very eyes, they may almost be said to have stumbled

over it; but they certainly failed to see it, to estimate its value, and to bring it into notice. * * * Now that it has succeeded, it may seem very plain to anyone that he could have done it as well. This is often the case with inventions of the greatest merit."

And in *Diamond Rubber Co.* v. *Consolidated Co.*, 220 U. S. 428, 435, the Supreme Court said:

"Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, and expert witnesses may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention. *But the law has other tests of invention than subtle conjectures of what might have been seen and yet was not.* It regards a change as evidence of novelty, the acceptance and utility of change as a further evidence, even as demonstration."

And in *Eibel Process Company* v. *Minnesota & Ontario Paper Company*, 261 U. S. 45, the Supreme Court said (p. 68):

"The fact that in a decade of an eager quest for higher speeds this important chain of circumstances had escaped observation, the fact that no one had applied a remedy for the consequent trouble until Eibel, and the final fact that when he made known his discovery, all adopted his remedy, leave no doubt in our minds that what he saw and did was not obvious and did involve discovery and invention."

This Pipkin invention is one of the fruits of the plaintiff's extensive research and development work in the incandescent lamp art. The very object of our patent laws is to encourage work of this character. The right to exclude infringers which the Pipkin patent gives to the plaintiff, its owner, is the consideration paid to induce such research and the disclosure of resulting inventions for free use by all members of the public after the expiration of the patent.

We respectfully submit that Pipkin's new bulb, the patent for which is here in issue, is an invention of great merit, one that has resulted in a real advance in electric lamps, and that the Pipkin patent is one which should be sustained even under the strictest interpretation of the standard of invention required for a valid patent.

Since the patent will have expired before this case can be decided by this Court, no question of an injunction is involved.

We submit that the judgment below should be reversed, and the Pipkin claims held valid and infringed, plaintiff to have the usual accounting.

Respectfully submitted,

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